INLAND MOLLUSKS

Directions for Collecting and Preparing.

By V. Sterki.

Our land and fresh-water mollusca are very interesting objects of study, not only for their anatomy, physiology, life history, habits and classification, but also for their geographical and local distribution and their variation.

In Ohio, we have over three hundred species, with many varieties and local forms, but from a large part of the state the fauna is still insufficiently known. Good work can be done anywhere, toward an approximately complete survey. Besides, in working up the ecology of various places, the mollusks deserve consideration as well as any other group of animals.

LAND SNAILS.

These are found living in woods, copses, along old fences and railway embankments, swamps and marshes (especially their borders), banks of rivers and creeks above high water mark. They are generally more common on hillsides than on low ground and rocky slopes, especially of limestone, are often wonderfully rich. During the day, in fair weather, they are generally in their retreats, coming out at night, in the mornings and evenings and often on damp, dark days and after rains. Occasionally they ascend trees and other plants. As a rule, they will be found under and about old logs and stumps and in their cavities, under loose bark, pieces of wood, stone slabs and bricks, in crevices of rocks, old stone heaps, etc. Many are on the ground, under dead leaves and among thick plant growth. Some *Succinea* are frequently found along ditches, ponds and lakes, and often on reeds and rushes standing in water.

During winter, they hibernate, either in the same places, or buried in soft earth, muck, etc., often assembled in large numbers.

A very handy tool for collecting is a small, strong hoe, especially the "Ferris hoe." The blade of a garden hoe is trimmed to a point in the middle and thus made heart-shaped,

and sharpened, and the handle is sawed off to about three feet. For collecting under dead leaves, etc., a small rake is helpful and large stretches can be raked over in a short time.

The snails, as they are gathered, are put into a box or can, with some moss or leaves at the bottom. It is a good plan to have the box covered with canvas or soft leather, or still better, with a thin rubber sheet such as a piece of an old tire, with a slit in it. The snails can be put in easily and are prevented from crawling or falling out, and there is no bother in removing and putting on a lid. If the box is fastened to the belt, both hands are left free for work.

Snails with very thin, fragile shells, e. g. *Succinea*, should be kept separate, lest they be broken. The smallest should be put into a wide mouthed bottle or vial or better in a wooden pill box.

For a longer trip, in diversified country, several receptacles should be provided. The specimens from a hillside should not be mixed with those from lowlands, or from a swamp, etc. To each collection a label should be added at once, noting the locality, its nature, etc., and the date.

Naked or shelless snails or slugs should not be overlooked, especially species of *Philomycus*, which are from half an inch to several inches long when extended. They are mostly found under the loose bark of decaying logs or stumps. Large *Limax* may be found in cellars, under board walks, in nurseries, etc.

In greenhouses and nurseries, especially old, established ones, a number of snails and slugs can be found that have been introduced with plants, etc., chiefly from Europe.

Collect large numbers of specimens wherever possible. It is desirable to secure good, living snails, but even dead shells should be taken if they appear in any way different from living ones; they may represent different species, or forms, and "a dead shell is better than none at all" for faunistic purposes.

SMALL SNAILS.

More than one half of the number of species of land snails are small to minute, some measuring only one to two millimeters. These in part live at the same places with the larger ones, but are frequently found also among mosses, lichens, fine debris, etc. Large numbers of small Pupidæ are occasionally seen crawling on old stumps. They may be taken up

singly, e. g. on the point of a knife, and put into a vial or small box, but in general this is a tedious task and the results are not in proportion to the time spent. The better way is to collect them wholesale, so to speak. With a small brush, the under side of pieces of wood, stones, old bricks, etc., the fine dirt under loose bark or decaying logs and stumps is brushed down into a pan, or on a piece of paper. Fine debris and dirt around old trees and stumps, under brush heaps, etc., are scooped up and the whole material is taken along.

Dead leaves, debris, moss from the ground, wood, rocks, etc., are gathered on a large piece of paper, or preferably muslin, (I use one two yards square), gently worked with the hands, shaken well and gradually removed. A sieve is very helpful in separating finer particles and dirt along with the small snails and this material is carefully gathered. The leaves, moss, etc., if wet, may be spread out on the sheet and left for partial drying while other collecting is done; or if it is not far from home or camp, they may be taken along in a large sack or basket and taken care of there.

Some minute snails, like *Vallonia* and *Vertigo* often live in lawns of cities and towns, sometimes by the thousands. If not secured otherwise, they may be trapped on old boards, bricks, etc., which are improved for this purpose if smeared with meat or grease.

PREPARING.

The larger snails are taken care of first and their soft parts must be extracted from the shells. A number of them are put in a tea strainer, or a piece of muslin, and immersed in nearly boiling water for about fifteen to thirty seconds, according to size, so that the columellar muscles are detached from the shells. Then the curved point of a long pin is stuck into the fleshy part, and the animal extracted, slowly and carefully, at the same time twisting the body or the shell. A safety pin, straightened out more or less, is convenient, making a handle at the same time. After some experience, one will succeed in removing the soft parts entire and will also know how long to scald for loosening the animal without "cooking" too much. If a part is broken off and left in the shell, the latter is filled with water and shaken vigorously, with the aperture closed, and as a rule the remnant can be washed out. Then

the shells are wiped clean, the inside with a wad of cotton or sponge, and left to dry. Shells clothed with hairs, for example, *Polygyra palliata* and *P. inflecta*, should not come into contact with cotton. Freshwater snails are treated in the same manner. The opercula of the operculate species should be kept with their shells, but not gummed in the apertures.

Of the soft parts extracted, at least some may be preserved in alcohol for future anatomical examination and they should be labelled carefully. Especially specimens of doubtful identity must be marked so that they are referable to their shells. Alcohol of about 25% is used first, for a few days, then changed to 40 or 50% and after a week or two to 60% or 70%.

Specimens especially wanted for anatomical examination are best drowned in water (preferably boiled and cooled) in corked bottles placed upside down or in sealed jars. In this way, they will extend more or less and the parts will be more in their natural position. Slugs wanted for the collection may be treated the same way before being put in alcohol.

Small and minute snails are left to themselves for days or weeks, in wooden or pasteboard boxes, to give them time to retire deep into their shells, when they may be dried in gentle heat; medium sized ones may be scalded before drying. They should not be dried in heat while fresh and this applies especially to those which have lamellæ and "teeth" in the apertures, or deeper inside, as *Pupidæ*, *Strobilops*, many *Zonitidæ* and the small *Polygyræ*, for the animals would emerge and obstruct those parts when dry, and thus make examination difficult or impossible.

SIFTINGS AND BRUSHINGS.

These when dry may be kept with their labels in boxes, paper bags or muslin sacks to be worked up at some convenient time. They should be gently but thoroughly rubbed in the hands in order to detach specimens clinging to leaves, debris, etc. Then, work is made much easier if finer and coarser materials are separated with a sieve or strainer, or with two of different meshes, or by shaking to and fro on a piece of strong paper. Portion after portion is spread out on the table and the snails are picked out with a fine pair of pincers; very small and fragile shells are better scooped up or lifted with a moist camel's hair brush. It is preferable to have a number of small boxes,

trays or dishes at hand, to separate the species at once, or at least the genera or groups. This will save a good deal of subsequent work and time.

After the specimens from a place are worked up, those of each species, if identified, are placed in a box, tray or vial. The latter may be corked if the specimens are perfectly dry, but otherwise should be closed with a wad of cotton or sponge.

DRIFT.

Drift accumulated along rivers, creeks, brooks, ravines, etc., after freshets and floods, in quantities from a handful or less to a wagon load or more, almost always contains mollusk shells, sometimes in large numbers and of many species. Generally they are dead shells, but these will be of interest for faunistics and often as "pointers" indicating the occurrence of a species or form which had not been found before. Fine drift is gathered up carefully and from heaps of coarse material it may be separated by sifting.

FOSSILS.

Fossil shells of land and fresh-water mollusks should be carefully collected wherever there is a chance for doing so. If the identity of the stratum cannot be ascertained, at least the locality should be exactly noted. Fossils have been collected at several places in the state, but not exhaustively, and there are probably others.

IDENTIFICATION.

This is often difficult for the beginner, especially with small and minute specimens. The best he can do is to send them to an expert or specialist, who will separate, name and return them. Send them all; often only a few are sent for naming and the balance kept, on the supposition that they are all identical, while two or several species may be mixed.

Siftings and brushings may be sent as they are, "dirt and all." Larger snails may be sent, separated or mixed up, with some moss or dead leaves to prevent jarring. Many a collector along other lines, an entomologist or botanist, may have chances to collect specimens and to gather brushings and siftings, which, by the way, may yield insects or other organisms of interest to himself. They will be of value in working up our fauna and make additions to the state collection.